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D E C I S I O N
of 24 November 1999

Case Number: T 0626/95 - 3.3.6

Application Number: 87117903.2

Publication Number: 0271004

IPC: C11D 3/386

Language of the proceedings: EN

Title of invention:
Detergent composition for clothing

Patentee:
Kao Corporation

Opponent:
PROCTER & GAMBLE EUROPEAN TECHNICAL CENTER N.V.
GENENCOR INTERNATIONAL INC.
Unilever N.V.

Headword:
Detergent composition/KAO

Relevant legal provisions:
EPC Art. 123(2), 54(3), 56

Keyword:
"Amendment (not admissible) - omission of essential features"
"Novelty (yes) - prior art not disclosing claimed subject-matter while possibly rendering it obvious"
"Inventive step (acknowledged) - selection of specific cellulases not obvious"

Decisions cited:
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Catchword:

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Case Number: T 0626/95 - 3.3.6

D E C I S I O N
of the Technical Board of Appeal 3.3.6
of 24 November 1999

Appellant: (Proprietor of the patent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 29 May 1995 revoking European patent No. 0 271 004 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: P. Krasa
Members: H. H. R. Fessel
A. C. G. Lindqvist

Summary of Facts and Submissions

I. European patent No. 0 271 004 in respect of European patent application No. 87 117 903.2, filed on 3 December 1987 and claiming a JP priority of 8 December 1986 (JP 292158/86), was granted on 21 April 1993 (Bulletin 93/16) on the basis of 2 claims directed to detergent compositions for clothing.

II. Notices of Opposition were filed on 20 January and 21 January (twice) 1994, respectively, by Procter & Gamble ETC. N.V., Genencor International Inc. and Unilever N.V., respectively. The opponents requested revocation of the patent in its entirety based on Articles 100(a) and (b) EPC, i.e. lack of novelty, inventive step and insufficiency (Articles 54(1 to 4), 56 and 83 EPC).

The opposition was supported by the following documents, still relevant for the decision of the Board:

D1: EP-A-0 265 823 (published 4 May 1988);

D2: US-A-4 435 307;

D3: EP-A-0 269 977 (published 8 June 1988);

D4: EP-A-0 207 974 (published 15 June 1988);

D6: EP-A-0 177 165; and

D10: Cellulase and cellulase derivatives, ed: Bigales and Segal, Part V, 1971.

The opponents disputed the validity of the priority date of the patent in suit as far as the cellulases specified in D1, D3 and D4 were concerned and alleged lack of novelty based on Articles 54(3) and (4) EPC as well as lack of novelty based on Article 54(2) EPC vis-à-vis D2 and D6. The objection as to inventive step was based on D2 in conjunction with D10, respectively D6 with D10. To support their allegation of insufficiency of disclosure the opponents mainly objected that the NDI (non-degrading index) test and the determination of the pH optimum, as specified in Claim 1, of the cellulase preparation were not repeatable, if CMC was used as the substrate.

III. By a decision issued in writing on 29 May 1995 the Opposition Division held the provisions of Articles 83 and 54 EPC to be met but revoked the patent for lack of an inventive step of the subject-matter of a single claim reading as follows (after amendment of an obvious clerical error):

"A detergent composition for clothing, which comprises (A) a cellulase having a non-degrading index of the following equation of not less than 500

$$\text{non-degrading index} = \frac{\text{Hydrolytic rate for low-crystalline cellulose}}{\text{Hydrolytic rate for highly crystalline cellulose}}$$

wherein said cellulase is an alkalophilic cellulase which has an optimum pH not less than 7 or whose relative activity at a pH of not less than 8 is 50% or over of the activity under optimum conditions when carboxymethyl cellulose (CMC) is used as a substrate, and wherein said

cellulase is contained in an amount of from 50 to 20,000 units, per kg of the detergent composition, in terms of an enzymatic activity determined when carboxymethyl cellulose (CMC) is used as a substrate;
(B) 5 to 60 weight-% of a surface active agent; and
(C) 5 to 40 weight-% of a divalent metal ion collector."

IV. On 21 July 1995 an appeal together with payment of the prescribed fee was lodged against that decision by the appellant (patentee). In its Statement of Grounds of Appeal, received by the EPO on 9 October 1995, the appellant disputed the alleged lack of an inventive step based on D2 in conjunction with D10.

V. The respondents agreed with the decision as to inventive step but disputed that the claimed subject-matter was novel and sufficiently disclosed.

VI. During oral proceedings held before the Board of Appeal on 24 November 1999, the appellant filed a new main request.

The single claim of the main request, Claim 1, differed from that underlying the decision under appeal by the addition of:

"whereby the cellulase is selected such that the detergent composition, when used in 100 cycles of washing and drying of a cotton material does essentially not degrade the tensile strength."

VII. The respondents maintained their objections as to sufficiency, novelty and inventive step and raised objections as to conciseness (Art. 84 EPC).

VIII. The appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the new main request submitted during oral proceedings or, alternatively, on the basis of an auxiliary request submitted on 25 October 1999 as "second auxiliary request".

The single claim of the auxiliary request differs from that underlying the decision under appeal in that the cellulase to be used, was specified. This was done by the introduction of the following passage at the end of the specification of component (A) and before the specification of component (B):

"wherein said cellulase is selected from the group consisting of alkaline cellulase K (produced by Bacillus sp. KSM-635, FERM BP 1485); alkaline cellulase K-534 (produced by Bacillus sp. KSM-534, FERM BP 1508); alkaline cellulase K-539 (produced by Bacillus sp. KSM-539, FERM BP 1509); alkaline cellulase K-577 (produced by Bacillus sp. KSM-577, FERM BP 1510); alkaline cellulase K-521 (produced by Bacillus sp. KSM-521, FERM BP 1507); alkaline cellulase K-580 (produced by Bacillus sp. KSM-580, FERM BP 1511); alkaline cellulase K-588 (produced by Bacillus sp. KSM-588, FERM BP 1513); alkaline cellulase K-597 (produced by Bacillus sp. KSM-597, FERM BP 1514); alkaline cellulase K-522 (produced by Bacillus sp. KSM-522, FERM BP 1512); CMCase I, CMCase II (both produced by Bacillus sp. KSM-635, FERM BP 1485); alkaline cellulase E-II and alkaline cellulase E-III (both produced by Bacillus sp. KSM-522, FERM BP 1512)."

The appellant held the new claims of the main and of the auxiliary request to meet all the requirements of the EPC.

IX. The respondents requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

Main request

2. *Article 123 EPC*

Claim 1 of the main request differs from that of Claim 1 of the decision under appeal in that the following was added at the end of that claim: "whereby the cellulase is selected such that the cellulase in the detergent composition, when used in 100 cycles of washing and drying of a cotton material does essentially not degrade the tensile strength."

The appellant alleged this amendment to constitute a functional technical feature being supported by the last full paragraph on page 36 of the application as filed (page 15, lines 14 to 18 of the patent in suit) in conjunction with page 40, second paragraph of the application as filed (page 17, line 41 of the patent in suit). The respondents disputed that the now claimed subject-matter met the requirements of Article 123(2) EPC since it was not disclosed by the above indicated passages.

Originally disclosed was a tensile strength test of cloth for which the three parameters concentration of the detergents, washing temperatures and the time for washing were indicated (page 36 of the application as filed). In

the Board's judgement, these parameters will influence cellulose degradation and are thus essential for the selection of the cellulase. Consequently the omission of this essential part of the disclosure amounts to an amendment not supported by the passages cited above.

For these reasons the subject-matter of that claim does not meet the requirements of Article 123(2) EPC which renders the main request inadmissible.

Auxiliary request

3. *Article 84 EPC*

One of the respondents alleged lack of conciseness of Claim 1 since either (i) the indication of the cellulase as one having a non-degrading index of not less than 500 or (ii) the list of cellulases specified is redundant. In this respect the Board notes that the patent as granted comprised a Claim 1 defining the cellulases by an NDI-value "of not less than 500" and a dependent Claim 2 listing specific cellulases in exactly the same manner as does the current single claim. It follows that the claim of the auxiliary request results from a combination of Claims 1 and 2 as granted, apart from certain additional amendments having no bearing on the present issue. Therefore, any unclearness and inconciseness of the claim under consideration was not created by the amendment. This holds also taking into account that the feature NDI-value "of not less than 500" of the claimed subject-matter was for the first time only during appeal proceedings found not to be distinguishing in view of the relative terms "low-crystalline" and "highly crystalline") used in its definition. Since Article 84 EPC cannot serve as a basis

for grounds of opposition any inconciseness of the claim, if present in the patent as granted, cannot be an obstacle to its admissibility at this stage of the proceedings.

4. *Articles 123(2) und (3) EPC*

The Board is satisfied that the group of cellulases in conjunction with the bacilli and their numbers of deposition was disclosed in the applicaiton as filed page 9, last paragraph in conjunction with Tables 3-1 and 3-2, pages 21 and 22 (page 5, lines 3 to 9 and Tables 3-1 and 3-2, pages 9 and 10 of the patent specification). The provisions of Article 123(2) EPC are thus met by the claim as are those of Article 123(3) EPC since the claim now reads only on cellulases originating from a restricted number of defined microorganisms whereas Claim 1 as granted did not contain such a restriction.

5. *Novelty*

5.1 The Board considers the claimed subject-matter to be new within the meaning of Articles 54(3) and (4) EPC as far as D1, D3 and D4 were concerned since none of these documents disclosed a detergent composition comprising the specified cellulase including surface active agent and divalent metal ion collector as claimed in Claim 1.

Respondent 3 submitted that D1 disclosed subject-matter anticipating that of Claim 1 in view of the following passage:

"Moreover these enzymes has the features that their activity is shown even at low temperatures and that they have a strong resistance to surface active agents,

chelating agents and proteinases. Accordingly, the alkaline cellulase K and the CMCases I and II of the invention can be effectively utilized not only as an additive for clothing detergents, but also as a biomass and in other fields." (page 19, lines 20 to 23).

He concluded that the second sentence, by referring to the first one disclosed in view of the term "accordingly" clothing detergent compositions comprising an alkaline cellulase of the patent in suit (i.e. one produced by bacillus sp. KSM-635), and further comprising sequesting agents and surfactants in conventional amounts, taking into account the skilled person's general knowledge.

The Board cannot accept this argument.

The first sentence of the quoted passage does not disclose, either explicitly or implicitly a detergent composition but refers only to enzymes and describes some of their properties. Therefore, this sentence as such does not disclose anticipatory subject-matter. It could, however, very well render obvious the use of the enzymes concerned in clothing detergents in view of their activity and property profile, a question which has not to be investigated here.

The second sentence of the quoted passage adds nothing to the information made already available by the first sentence. It could only support a hypothetical finding that the use of the enzymes concerned as clothing detergents and the respective compositions were obvious to a skilled person in view of the disclosure of D1.

The same considerations apply, mutatis mutandis, to the

similar lack of novelty objections based on D3, page 61, lines 2 to 7 and on D4, page 67, lines 2 to 7.

For these reasons the Board finds that the subject-matter of Claim 1 is novel in view of the disclosure of documents D1, D3 and D4.

5.2 Novelty under Articles 54(1) and (2) EPC has no longer been disputed by the respondents and the Board sees no reason to do so.

6. *Inventive step*

The patent in suit relates to a detergent composition for clothing comprising an alkalophilic cellulase.

D2 relates to a harshness reducing, enzymatic additive, for a main wash detergent based on a fungal cellulase having an extraordinarily high activity at alkaline pH values.

D6 discloses detergent compositions for washing fabrics which are capable of cleaning and softening fabrics by the same wash liquor.

D10 shows that cellulase is a group of enzymes comprising different components such C_1 and beta cellulase attacking crystalline or swollen celluloses respectively.

6.1 D2 was considered by the parties and the Opposition Division to represent the appropriate relevant prior art for the evaluation of inventive step on the basis of the problem solution approach.

6.2 The Board sees no reason to deviate therefrom and considers

the problem to be solved by the patent in suit versus that prior art in the provision of an alkalophilic cellulase containing detergent which essentially does not reduce the tensile strength of the washed fabrics.

6.3 This problem is said to be solved by the detergents specified in Claim 1 containing the cellulases specified in that claim.

6.4 In view of the patent specification - especially in view of the experimental results given in Tables 6 and 7 - the Board is satisfied that the desired results were effectively achieved by the claimed means.

6.5 The Board did not consider the effect on tensile strength to be a mere bonus effect as alleged in the proceedings, since these effect was, as pointed out already on page 4, last paragraph of the application as filed, just from the beginning a problem which the patent in suit sought to solve. Thus it cannot be said that the problem was, with regard to known detergents containing alkali-resistant cellulases, merely to find further cellulases reducing harshness and having a fairly good dirt-removing effect. This finding is corroborated by the fact that D2 and D6 did not address the negative effect on the properties of cotton, expressed as reduction of tensile strength, which may be caused by the alkalophilic cellulases.

7. It has now to be considered whether the claimed solution involves an inventive step.

7.1 D2 disclosed alkaline cellulase preparations of Humicola insolens as well as detergent compositions comprising them. These main wash detergent compositions had a high activity

at pH-values normally prevailing in main wash solutions and the specified cellulase acted as a harshness reducing agent. Besides the softening effect cellulases with a high C_x activity, as those produced from strain DSM 1800, exhibit a strong dirt loosening and anti-redeposition effect (loc.cit. column 3, lines 15 to 20 in conjunction with lines 59 to 62). Moreover it was known from D2 that by fractionation of cellulase, fractions enriched in C_x may be obtained having an extraordinary good harshness reducing ability (column 4, lines 44 to 47). This document, however, is silent as to an effect of that cellulase, or its preferred fraction, on tensile strength. Thus, D2 alone cannot render the claimed subject-matter obvious.

7.2 From D10 a skilled person was aware that cellulase is a group of enzymes acting together but exhibiting differences in activity on various substrates. These activities were different for cellulases of different organisms or for cellulases of the same organism grown under various conditions. Moreover, it was known from page 1083 of D10, that the main components of the cellulase complexes are:

(1) C_1 enzymes required for action on crystalline cellulose

(2) endo-(1->4)-ß-glucanase

(3) exo-(1->4)-ß -glucanase

(4) ß-glucosidase.

The endo- and exo-glucanases (2 and 3) are together referred to as C_x enzymes.

From page 1984, 4th full paragraph, it was known that C_1 acts on crystalline cellulose (e.g. cotton fibre) in such a way that subsequent action by the C_x enzymes becomes possible and that with the assistance of C_1, the (1->4)-ß-glucanases hydrolyse crystalline celluloses; in the absence of C_1, they hydrolyse only noncrystalline celluloses, such as those produced by swelling, grinding, or reprecipitation from solution.

A skilled person seeking to solve the above problem would know from D2 that there exists a Humicola strain DSM 1800 which produces an alkaline cellulase with a high C_x activity at alkaline pH values and that by fractionation a fraction may be obtained which has extraordinary good harshness reducing ability. From D10 that person would know that the C_x complexes hydrolyse only noncrystalline celluloses, such as those produced by swelling, grinding, or reprecipitation from solution. He would further know that with the assistance of C_1 the C_x complexes hydrolyse crystalline celluloses. Thus he could assume that the presence of C_1 is of importance for the degradation of crystalline fibres and thus results in a negative effect on the tensile strength of cotton fibres.

Combining that with the teaching given by D2 a skilled person would know why complexes with a high C_x activity may lead to favourable washing results. Both documents are, however, silent as to the effect produced by detergents using the cellulases specified in Claim 1 of the patent in suit.

Even if assuming that by high C_x activity is implicitly meant low C_1 activity, the teaching of D2 would only be that an alkalophilic cellulase may be produced by strains

of Humicola insolens or Humicola grisea var. thermoidea being apt to reduce harshness in a washing process due to its high C_x activity. A skilled person would not be taught or hinted at that there exist further cellulases, as those specified in the patent in suit, having an excellent C_x activity but at the same time a C_1 activity not leading to an undesired reduction in tensile strength.

7.3 Starting from D6 would not lead to a different result. This document too discloses alkaline cellulases being different from those specified in Claim 1 of the patent in suit and stresses the importance of C_x activity, as does D2. There is no need to go into a detailed discussion of that document since it does not add anything to the state of the art as disclosed in D2.

The Board considers, for the reasons given above, the selection of the cellulases specified in the claim of the auxiliary request as a solution to the existing technical problem involving an inventive step. In this context it was not decisive whether a skilled person would know that the alkalophilic cellulases in detergent compositions should have a high C_x activity but a low C_1 activity, since the prior art did not foreshadow that essentially no damage of cotton fibres would be experienced when using the specified cellulases. Thus a skilled person could have used, in the light of the teaching given by D2 and D6, other alkalophilic cellulases having a high C_x activity but he would not have used those claimed with a reasonable expectation of success to solve the above problem.

Therefore the subject-matter of the claim of the auxiliary request involves an inventive step.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is maintained on the basis of Claim 1 of the auxiliary request, as single claim, with a description yet to be adapted.

The Registrar: The Chairman:

G. Rauh P. Krasa